Oregon

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July 22, 2019

Mr. Davis Zhen
U.S. Environmental Protection Agency
1200 Sixth Avenue
Seattle, WA 98101

via electronic delivery (email)

Re: DEQ Comments on PDI Evaluation Report
Portland Harbor Superfund Site

Dear Mr. Zhen:

Oregon Department of Environmental Quality (DEQ) conducted an initial review of the key findings provided in the June 17, 2019 ***PDI Evaluation Report, Portland Harbor Pre-Remedial Design Investigation and Baseline Sampling, Portland Harbor Superfund Site*** (Report). The report presents the results of a baseline sampling effort intended to update Site conditions prior to remedial design. In addition, the report presents recommendations for revising the Conceptual Site Model (CSM) and updating EPA's Record of Decision (ROD).

DEQ appreciates the significant effort and expense associated with generating a robust, multi-media data set and analysis with which to establish pre-remedial baseline conditions and for use in remedial design. Pending results of the EPA validation process, DEQ supports use of the results to 1) establish current (pre-remedy) conditions for comparison with future monitoring results, and 2) inform remedial design on an SMA-specific basis. However, DEQ does not support change the ROD at this time. Any changes to the ROD, or underlying analysis and assumptions upon which the ROD relied, would necessarily trigger an updated evaluation of the State's concurrence with the ROD. DEQ's assessment of each of the proposed updates to the Portland Harbor remedial approach are provided below.

1. **Background Sediment Contaminant of Concern (COC) Concentrations.** The Report proposes revising background concentration estimates. DEQ agrees that a robust estimate of background conditions is important to understanding how upriver conditions will impact the Portland Harbor remedy over time. However, DEQ does not see a need to revise sediment background concentration estimates at this time.

   DEQ acknowledges that some COC concentrations exceed ROD cleanup levels (CULs) in the Downtown/Upriver Reach. DEQ has been and continues to conduct cleanups in this area, and therefore concentrations are expected to decrease over time. This anticipated decrease in concentration is true for bedded sediment concentrations and, with additional passage of time, fish tissue concentrations. Further, the Report does provide

lines of evidence that ROD CULs based on background are achievable. For example, sediment trap sample results show that PCB concentrations entering the Portland Harbor from upstream are below cleanup levels (see Attachment A of this letter).

Regardless, background conditions do not appreciably change forthcoming remedy designs because RALs, which are much higher values than CULs, are used to identify areas for active cleanup. Therefore, DEQ encourages implementation of the ROD without delay. As remedial construction activities progress and the natural recovery portion of the remedy is underway, DEQ supports continued monitoring and evaluation of background conditions, as warranted, under the CERCLA 5-year review framework.

2. **Arsenic and Manganese Groundwater CULs.** The Report proposes to revise arsenic and manganese groundwater CULs based on background measurements in porewater. DEQ agrees that arsenic and manganese are naturally present in the Willamette River basin, and that these inorganic chemicals may be associated with natural conditions, rather than contamination, in some locations. Note, the determination as to whether the inorganic chemicals are associated with contamination should be conducted on a location-by-location basis. Arsenic and manganese concentrations are primarily controlled by local aquifer and sediment geochemistry, including oxidation state. Because a range of geochemical conditions occurs along the lower Willamette, it is important to consider the applicability of the background data set relative to the conditions being assessed. DEQ supports use of the background data set on a location-by-location basis when it is demonstrated that the geochemical conditions under which the background data were generated are applicable to the area of interest.

3. **Sediment CULs.** The Report proposes to change sediment CULs. The rationale for the change is related to uncertainty in modeling assumptions and differences between predicted and empirical tissue concentrations. DEQ acknowledges there are uncertainties in the food web model (as there is in most any model). However, as indicated in the Report, regardless of the model outcomes, risk-based concentrations to meet fish consumption goals are anticipated to be below background conditions. Therefore, DEQ does not support revising CULs. Rather, DEQ supports continued monitoring and evaluation of background conditions as part of the 5-year review process, as indicated above (Comment 1).

4. **Fish Tissue Targets.** The Report proposes changing tissue target concentrations for two reasons: 1) upstream smallmouth bass (SMB) tissue concentrations exceed some of the ROD target tissue concentrations, and 2) to reflect different human exposure assumptions than those used in the Portland Harbor remedial investigation (RI). With respect to the first reason, DEQ acknowledges that fish tissue concentrations in the Downtown/Upriver Reaches exceed some target tissue levels, but does not support revising the levels. As previously indicated, DEQ has completed and continues to conduct cleanups in the Lower Willamette River, in addition to implementing ongoing source control activities. Tissue concentrations are expected to decrease over time as these activities are completed. More importantly, the tissue target levels are not CULs and are instead provided as a basis for evaluating tissue recovery relative to risk-based levels. Because RALs - not tissue target levels - are used to identify areas for active cleanup, updating tissue target levels does not change forthcoming remedy designs, nor does it affect short-

term (5-year) outcomes. Therefore, DEQ supports collecting additional fish tissue data in parallel with ROD implementation to monitor changes in fish tissue concentrations over time.

With respect to the Report proposal to change exposure assumptions, DEQ discourages changes to exposure assumptions used to model human health risk from those used during the remedial investigation. All parties were extensively involved, including in the formal dispute process, in determining the approach and exposure values used in the risk assessment as part of the remedial investigation. It is not appropriate to conduct a new risk assessment with different assumptions at this stage of the project.

5. **Sediment RALs.** The Report indicates RALs should be updated to reflect significant Site recovery since the RI data were collected. DEQ agrees that natural recovery is occurring in localized areas, and is pleased to see that surface water concentrations are lower than results previously reported during the Remedial Investigation. This is consistent with DEQs evaluation of surface water loadings and may be associated with the significant efforts parties have put towards controlling sources to the river. However, DEQ notes that the data are insufficient to conclude that site-wide natural recovery is occurring to a degree that warrants changing RALs. A primary line of evidence the Report relies on to support updates to the RALs is the decrease in site-wide SWACs. SWACs presented in the Report are based on a very different dataset than the historical dataset used in the Portland Harbor RI/FS and are therefore not directly comparable. The RI/FS sampling targeted nearshore areas with the highest contaminant concentrations while the baseline dataset covers the entire site including the lesser contaminated navigation channel. The baseline dataset averages out the highest concentrations in the site and concentration reductions would be anticipated due to the change in sample design alone, regardless of natural recovery rates. It is important to note that the baseline sampling approach was developed with input from EPA to establish a point of comparison for future datasets. It was not designed to be directly comparable to the historical dataset used in the RI/FS. Therefore, multiple rounds of the baseline sampling design are needed before meaningful conclusions on Site recovery can be made.

   Another line of evidence the Report relies on to indicate that significant recovery has occurred is Site-wide net deposition and burial of contaminants. DEQ notes that Site-wide sediment deposition is not a relevant metric for evaluating areas requiring active cleanup. Sediment deposition and erosion should be considered on a localized scale in design and include evaluation of SMA-specific erosive forces such as prop wash and waves that have the potential to expose buried contamination in the future. Appendix D of the Report provides useful information for areas at smaller spatial scales (e.g., Willamette Cove is largely depositional whereas areas that appear erosional such as Willbridge Cove may be due to site operations rather than hydrodynamic forces). The information provided in this appendix highlights the importance of location-specific information in evaluating hydrodynamic forces, and underscores how net deposition is not a relevant metric for evaluating the amount of remedial action required. DEQ supports further evaluating system stability on an SMA-specific basis to inform remedial design.

DEQ acknowledges that some of the historical data may no longer be representative of current conditions, however data representativeness should be made on a sample-by-sample basis such that the most robust and informative data set is used going forward in design. All data (historical and recent data) deemed to be reliable and useable should be evaluated during remedial design with respect to representativeness of current conditions.

DEQ, however, is supportive of a reevaluation of the dioxin/furan congener RALs. The dioxin/furan congener ROD RALs were established with a limited number of samples, and in limited areas, whereas the new data significantly increase the sample size and spatial coverage, both in the Portland Harbor and upstream. Reevaluation of dioxin/furan RALs should not delay ROD implementation given that, as indicated in the Report, dioxin/furan RAL exceedances are generally collocated with SMAs associated with the other focused COCs (i.e., total PCBs, total PAHs, and DDx). While reevaluation of dioxin/furan congener RALs could show that updates are warranted, the updates are not anticipated to significantly change the remedy. Therefore, DEQ supports continued progress toward ROD implementation in parallel with the evaluation.

6. **Risks.** The Report indicates that site-wide risks have decreased by 70% to 96% as a result of decreased concentrations in smallmouth bass (SMB) tissue collected in 2018. DEQ does not agree with this conclusion, and concludes much lower risk reductions (less than 10%) to be more representative. The substantial decrease in fish consumption risk noted in the Report uses inappropriate exposure assumptions to arrive at this conclusion. As explained in more detail in Attachment B of this letter, the total PCB SMB tissue concentrations are inappropriately applied to other resident fish. For example, the carp fillet concentration of 19,000 µg/kg used in the RI was replaced with the SMB concentration of 606 µg/kg. Carp were not sampled in 2018, nor is there any evidence to support an assumption of such a significant decrease in concentration in carp. Applying SMB fish tissue concentrations to carp leads to a corresponding, and inaccurate, two-order of magnitude decrease in risk. Risk outcomes calculated using current SMB tissue data, and holding steady concentrations for other residential fish, are largely unchanged from the RI conclusions, with site-wide PCB risk reductions ranging from 2% to 6% (Attachment B). DEQ supports moving forward with ROD implementation without delay for protection of human health and the environment.

7. **Principal Threat Waste (PTW) Management.** The Report requested that concentration thresholds and other criteria for PTW management should be reviewed in light of the Report findings. The rationale provided for the request is that 1) there is a substantial decline in the estimates of Site risks relative to the RI estimates, and that 2) modeling presented in the Report shows that caps without amendments could be protective above ROD PTW levels. As indicated above (Comment 6), the decrease in risk purported in the Report is the result of inappropriate assumptions; therefore, no changes in PTW management associated with the risk analysis are appropriate. With respect to chemical isolation layer modeling, DEQ supports applying SMA-specific parameters using the most up-to-date models available to the industry to support design and ensure constructed caps are effective.

Thank you for the opportunity to comment. Do not hesitate to call or email if you have questions.

Respectfully,

Madi Novak

Madi Novak
Remedial Action Project Manager
NWR Cleanup Section

ec: Mike Poulsen, DEQ
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Attachments

Attachment A
Sediment Trap Results Assessment

Sediment traps were placed in two locations at RM 11.8 (at the upriver boundary of the Portland Harbor) and at RM 16.2 (near the upriver boundary of the Downtown Reach). Sediment traps were deployed to collect sediment representative of three conditions: Low-flow, storm-flow, and high-flow. Samples collected during storm-flow and high-flow conditions are more likely to be representative of concentrations that enter the Portland Harbor from upstream. Water velocities are higher under these flow conditions and will tend to move any particulates and associated contamination upstream to downstream. Low-flow conditions have a higher potential to represent nearby impacts that are temporarily suspended, and then resettle. During low-flow conditions the river experiences flow-reversals (i.e., the river flows upstream) and water levels are low. Bedded sediment has the potential to be suspended, particularly as a result of anthropogenic activities, such as pleasure boating and industrial ship and tug traffic.

The report presents an evaluation intended to establish that the sediment traps captured suspended solids from the water column rather than from resuspension of nearby sediment. The evaluation consists of, in the case of RM11E sediment trap samples, comparing the composition of sediment in the traps with the composition of three surface sediment samples collected within one mile of the trap. DEQ notes that sediment composition in the Willamette River can vary considerable within a mile, and at even much smaller spatial scales. Conclusions about the origins of the sediment accumulated in the sediment traps cannot be drawn based on this limited and disperse data set.

The difference in PCB concentrations measured in sediment traps at RM 11.8 demonstrates the impacts of the different flow conditions. Storm-flow and high-flow sediment trap sample results representative of settleable sediment entering the Portland Harbor PCBs were all below the PCB CUL of 9 µg/kg. Sediment trap samples collected during low-flow conditions, that are more likely to be representative of nearby Portland Harbor PCB contamination, exceeded the CUL at RM 11.8.

Attachment B
Decrease in PCB Concentrations in Smallmouth Bass and Associated Risk

PCB concentrations in smallmouth bass fish tissue are generally lower than in previous sampling efforts. Table B-1 compares total PCB congener concentrations in site-wide whole body smallmouth bass.

From these results, it appears the concentration of total PCBs in SMB are now approximately a factor of 3 lower than the exposure point concentration used in the risk assessment. Consequently, calculated risk from exposure to total PCBs in SMB may also be correspondingly lower. However, Table B-1 also shows that concentrations of PCB dioxin-like congener TEQ appear to have increased slightly, complicating the evaluation of PCB risk changes between 2012 and 2018 in SMB.

Most importantly, the decrease in total PCB concentrations in SMB does not result in the substantial decrease in site-wide cancer risks as indicated in the Report. DEQ notes that many of the risk conclusions in the Report are drawn from a re-evaluation of Tribal mixed-diet site-wide risk. The mixed-diet approach uses relative proportions of consumed fish based on a regional study, with about half the fish being anadromous, and half resident fish. The only new fish tissue data are concentrations for SMB. The approach in the Report assumes that concentrations of chemicals in the other resident fish are equal to the concentrations recently measured in SMB. This is not appropriate. As stated in the RI report, Appendix F, Section 3.4.5:

> Averaged over a harbor-wide scale, the highest concentrations of persistent chlorinated organic compounds (such as PCBs and dioxins/furans) were detected in common carp, with increasingly lower concentrations detected in brown bullhead, smallmouth bass, and black crappie. PCB concentrations detected in common carp were as much as an order of magnitude greater than detected in smallmouth bass.

Concentrations of chemicals in the other resident species were not measured in 2018. It is a severe underestimate of mixed-diet PCB concentrations to assume that all resident fish have the same concentrations as SMB. Tables B-2 (Tribal) and B-3 (subsistence/recreational) show how a reasonable analysis of new data compares with the evaluation in the Report.

Table B-3 shows the reduction in concentration for subsistence mixed-diet fillets. This scenario was used as the basis for the target levels for fish tissue. Using the analysis in the Report, with the unwarranted assumption that SMB data represent all resident fish, the reduction in PCB concentration is 99 percent. However, using the new SMB data and existing carp data, DEQ calculates a far more reasonable reduction in PCB concentration of 2 percent. This small change does not warrant a change in remedial objectives.

Table B-4 summarizes the study area-wide calculated PCB risks for the different exposure scenarios. Given the minor changes in mixed-diet PCB concentrations shown in Tables B-2 and B-3 using DEQ's evaluation, there is essentially no change in excess cancer risk, child noncancer

risk, or infant cancer. This contrasts with the results of the Report evaluation (using the RI/FS approach) showing substantial reductions in risk. Also, the Report evaluation did not include an evaluation of risks to infants, the most important result of the risk assessment for PCBs.

Table B-1. Comparison of 2018 Smallmouth Bass Study Area-Wide Whole Body Data with Remedial Investigation Risk Assessment Data

	RI Risk Assessment[a]	PDI[b]	Percent Change
Total PCB Congener Concentration[c] (µg/kg)			
Mean	1,000	361	-64%
95UCL[d]	2,000	606	-70%
Maximum	6,400	4,060	-37%
PCB Dioxin-like TEQ Concentration (µg/kg)			
Mean	0.0078	0.00611	-22%
95UCL[d]	0.0097	0.0116	+20%
Maximum	0.036	0.113	+214%

Notes:

a) Portland Harbor Final Remedial Investigation Report, Appendix F, Baseline Human Health Risk Assessment, Table 3-12.
b) Pre-remedial Design Investigation, Appendix G, Table A-4
c) PCB adjusted congener concentration (non-dioxin like) in whole body tissue.
d) 95UCL = 95 percent upper confidence limit on arithmetic mean

Table B-2. Comparison of Tribal Mixed-Diet Exposure Point Concentrations

Species	Diet Fraction	RI Calculation[a]		DEQ Calculation with new SMB data		PDI Approach[b] (RI/FS Scenario)	
		PCB[c] Conc. (µg/kg)	Weighted[e] PCB[c] Conc. (µg/kg)	PCB[c] Conc. (µg/kg)	Weighted[e] PCB[c] Conc. (µg/kg)	PCB[c] Conc. (µg/kg)	Weighted PCB[c] Conc. (µg/kg)
Tribal Whole Body							
Salmon	0.384	16	6.2	16	6.2	16	6.6
Lamprey	0.07	45	3.1	45	3.1	45	3.4
Sturgeon	0.049	950	47	950	47	950	47
SMB[d]	0.124	2,000	250	**606**	**75**	**606**	**75**
Crappie	0.124	280	35	280	35	**606**	**75**
Carp	0.124	19,000	2,400	19,000	2,400	**606**	**75**
Bullhead	0.124	1,500	190	1,500	190	**606**	**75**
Total Weighted Conc. (µg/kg)			**2,900**		**2,800**		**358**
Percent Reduction in PCB Concentration					**6%**		**88%**
Tribal Fillet							
Salmon	0.384	14	5.5	14	5.5	14	5.5
Lamprey	0.07	45	3.1	45	3.1	45	3.1
Sturgeon	0.049	950	47	950	47	950	47
SMB	0.124	500	61	**75.6**	**9.4**	**75.6**	**9.4**
Crappie	0.124	32		32		**75.6**	**9.4**
Carp	0.124	19,000	2,400	19,000	2,400	**75.6**	**9.4**
Bullhead	0.124	1,300		1,300		**75.6**	**9.4**
Total Weighted Conc. (µg/kg)			**2,500**		**2,500**		**93**
Percent Reduction in PCB Concentration					**2%**		**96%**

Notes:

a) Portland Harbor Final Remedial Investigation Report, Appendix F, Baseline Human Health Risk Assessment, Tables 3-12 to 3-15.
b) PDI, Appendix G, Tables A-4, A-6, and A-7a.
c) PCB adjusted congener concentration (non-dioxin like)
d) SMB = small mouth bass
e) Weighted concentrations in the RI/FS report are rounded to two significant digits. Because of rounding, sums may not exactly match reported totals.
f) Shading indicates modifications of fish tissue concentrations used in BHHRA.

Table B-3. Comparison of Subsistence/Recreational Mixed-Diet Exposure Point Concentrations

Species	Diet Fraction	RI Calculation[a]		DEQ Calculation with new SMB data		PDI Approach[b] (RI/FS Scenario)	
		PCB[c] Conc. (µg/kg)	Weighted[f] PCB[c] Conc. (µg/kg)	PCB[c] Conc. (µg/kg)	Weighted[f] PCB[c] Conc. (µg/kg)	PCB[c] Conc. (µg/kg)	Weighted PCB[c] Conc. (µg/kg)
Subsistence/Recreational Whole Body							
SMB[e]	0.25	2,000	NC[d]	**606**	**152**	**606**	**152**
Crappie	0.25	280	NC	280	70	**606**	**152**
Carp	0.25	19,000	NC	19,000	4,750	**606**	**152**
Bullhead	0.25	1,500	NC	1,500	375	**606**	**152**
Total Weighted Conc. (µg/kg)					**5,300**		**606**
Subsistence/Recreational Fillet							
SMB	0.25	500	120	**75.6**	**19**	**75.6**	**19**
Crappie	0.25					**75.6**	**19**
Carp	0.25	19,000	4,900	19,000	4,900	**75.6**	**19**
Bullhead	0.25					**75.6**	**19**
Total Weighted Conc. (µg/kg)			**5,000**		**4,900**		**76**
Percent Reduction in PCB Concentration					**2%**		**98%**

Notes:

a) Portland Harbor Final Remedial Investigation Report, Appendix F, Baseline Human Health Risk Assessment, Table 3-12.
b) PDI, Appendix G, Tables A-4, A-6, and A-7a.
c) PCB adjusted congener concentration (non-dioxin like)
d) NC = not calculated
e) SMB = small mouth bass
f) Weighted concentrations in the RI/FS report are rounded to two significant digits. Because of rounding, sums may not exactly match reported totals.
g) Shading indicates modifications of fish tissue concentrations used in BHHRA.

Table B-4. Comparison of Study Area-wide PCB [e] Risk Calculations for Different Fish Ingestion Scenarios

		2013 BHHRA[a]			DEQ Approach with 2018 Data		PDI (RI/FS Scenario)[d]	
	Exposure Scenario[b]	**EPC[c] (µg/kg)**	**Calculated Risk**	**Source**	**EPC[c] (µg/kg)**	**Calculated Risk**	**EPC[c] (µg/kg)**	**Calculated Risk**
Excess Cancer Risk	Tribal WB	2,900	2E-02	Table 5-63	2,800	2E-02	358	2E-03
	Tribal F	2,500	1E-02	Table 5-63	2,500	1E-02	93	5E-04
	Subsist. F	5,000	1E-02	Table 5-74	4,900	1E-02	606	2E-04
	Rec. F	5,000	4E-03	Table 5-74	4,900	4E-03	76	6E-05
Child Hazard Quotient	Tribal WB	2,900	700	Table 5-61	2,900	700	358	87
	Tribal F	2,500	600	Table 5-61	2,500	600	93	23
	Subsist. F	5,000	1,000	Table 5-67	4,900	1,000	606	15
	Rec. F	5,000	300	Table 5-67	4,900	100	76	5
Infant Hazard Quotient	Tribal WB	2,900	9,000	Table 5-64	2,900	9,000	358	NC[f]
	Tribal F	2,500	8,000	Table 5-64	2,500	8,000	93	NC
	Subsist. F	5,000	10,000	Table 5-76	4,900	10,000	606	NC
	Rec. F	5,000	4,000	Table 5-76	4,900	4,000	76	NC

Notes:

a) Portland Harbor Final Remedial Investigation Report, Appendix F, Baseline Human Health Risk Assessment
b) WB = whole body; F = fillet; Subsist. = subsistence fisher; Rec. = recreational fisher
c) EPC = exposure point concentration; Data from Tables B-2 and B-3.
d) Pre-remedial Design Investigation, Appendix G, Table 5. Because risks shown here are only for PCB, total risks shown in Table 2.6 of the PDI report are higher.
e) PCB adjusted congener concentration (non-dioxin like)
f) NC = not calculated